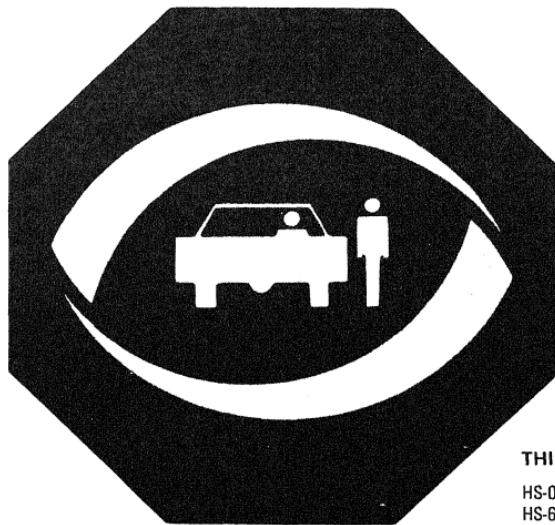




# An Announcement of Recent Acquisitions. . .

HSL No. 71-11  
March 19, 1971

HSL No. 71-11 March 19, 1971 HS-008 715-735, HS-600 377, HS-610 427 & HS-610 557, HS-800 359-363,  
HS-800 376 & HS-800 382-384, HS-800 391-392, HS-800 395 & HS-800 406-407, HS-800 409 & HS-800 412,  
HS-810 151-153, HS-820 094 & HS-820 097-101



THIS ISSUE CONTAINS

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## INTRODUCTION

Publications announced in *Highway Safety Literature* include the most recent additions to the collection of the NHTSA Scientific & Technical Information Service. Subject areas covered include all phases of highway, motor vehicle, and traffic safety, especially those encompassed by the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966.

Individual issues of *HSL* are numbered according to the year and the issue number within that year; thus, 71 designates the year and 1, 2, 3, etc. the individual issues. To aid the user in location citations by the HS-number, the cover bears the inclusive entry numbers for each issue.

Entries in *HSL* are arranged according to the revised NHTSA Subject Category List shown in the Table of Contents. The List is a two-level arrangement consisting of five major subject fields subdivided into 58 subject groups. Documents related directly to the National Highway Traffic Safety

Administration (NHTSA) are announced in a separate section headed NHTSA DOCUMENTS and are numbered in five distinct series: NHTSA Accident Investigation Reports (HS-600 000 series), NHTSA Compliance Test Reports (HS-610 000 series), NHTSA Contractors Reports (HS-800 000 series), NHTSA Staff Speeches, Papers, etc. (HS-810 000 series), and NHTSA Imprints (HS-820 000 series). For NHTSA DOCUMENTS in series HS-600 000 and HS-610 000, individual full case reports are available for inspection at the National Highway Traffic Safety Administration; or for purchase from NTIS (see page ii). Although announced together in a separate section, these documents are also assigned specific subject categories for machine retrieval.

A document which contains a number of separate articles is announced as a complete volume in the subject category most applicable to it as a whole. Entries for the individual articles appear in their most specific subject category.

## SAMPLE ENTRIES

Subject Category Array		
NHTSA Accession no.....	HS-800 218	Fld. 5/21; 5/9
Title of document.....	AN INVESTIGATION OF USED CAR SAFETY STANDARDS-SAFETY INDEX: FINAL REPORT. VOL. 6 - APPENDICES G-L	
Personal author(s).....	by E. N. Wells; J. P. Fitzmaurice; C. E. Guilliams; S. R. Kalin; P. D. Williams	
Corporate author.....	Operations Research, Inc., Silver Spring, Md., O15000	← For computer use only
Collation.....		
Publication date.....	12 Sep 1969 150p Contract FH-111-6921 Report no. ORI-TR-553-Vol-6; PB-190 523	
Abstract.....	Appendices G-L to this study of used car safety standards include: indenture model diagrams for classes I-IV motor trucks; degradation, wear, and failure data for motor truck classes I-IV; and safety index tables for classes I-IV motor trucks.	
	Search terms:	Wear /Trucks; Failures /Trucks; Used cars; Inspection standards /Trucks; Inspection standards /Data

AVAILABILITY: NTIS

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NOTE: ( ) Numbers in parentheses following certain subject groups indicate the Highway Safety Program Standards (No. 1, and up) and/or Federal Motor Vehicle Safety Standards (No. 101 and up) which may apply to these groups.

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NOTE: Material published in Highway Safety Literature (HSL) is intended for the information and assistance of the motor vehicle and highway safety community. While brand names, equipment model names and identification, and companies may be mentioned from time to time, this data is included as an information service. Inclusion of this information in the HSL should not, under any circumstances, be construed as an endorsement or an approval by the National Highway Traffic Safety Administration, Department of Transportation of any particular product, course, or equipment.

# AVAILABILITY OF DOCUMENTS AND INSTRUCTIONS FOR ORDERING

Department of Transportation personnel may borrow copies of publications directly from the NHTSA. Outside the Washington, D.C. area, phone (202) 426-2768. In Washington, D.C. area, use government ID, phone 118-62768. Non-DOT personnel should contact their company or agency libraries for assistance.

Journals cited may be obtained through most research libraries.

Contractors' reports and other documents can usually be obtained as indicated under AVAILABILITY. However, there is no certainty that retention copies will be available for more than a limited period after a document is issued.

The more common distribution sources are identified by symbols which are explained below:

**NTIS:** National Technical Information Service (formerly Clearinghouse for Federal Scientific and Technical Information—CFSTI), Springfield, Va. 22151. Order by accession number: HS, AD, or PB. Prepayment is required by NTIS (CFSTI) coupon (GPO coupons are not acceptable), check, or money order (made payable to the NTIS). PC (Paper copy; full size original or reduced

facsimile) \$3.00 up; MF (microfiche approximately 4x6" negative sheet film; reader required) \$0.95.

**GPO:** Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Give corporate author, title, personal author, and report number. Prepayment is required by GPO coupon (NTIS [CFSTI] coupons are not acceptable), check or money order (made payable to the Superintendent of Documents).

**HRB:** Highway Research Board, National Academy of Sciences, 2101 Constitution Ave., N.W., Washington, D.C. 20418.

**NHTSA:** National Highway Traffic Safety Administration General Services Division, Washington, D.C. 20591 (Telephone (202) 426-0874).

**SAE:** Society of Automotive Engineers, Dept. HSL, 2 Pennsylvania Plaza, New York, N.Y. 10001. Order by SAE report number. Prices given are list; discounts are available to members and sometimes to libraries and U.S. Government Agencies. Prepayment is required; orders without payment are subject to a \$1 handling charge.

## IMPORTANT

WHEN REQUESTING a document, to be absolutely sure you receive what you order, give the accession number (HS, PB, AD number) or report number (in cases such as an SAE document), title of report, and the personal or corporate author (whichever is cited). When requesting an HS-numbered document from NTIS (CFSTI), add DOT/ to the prefix HS-, example HS-800 000 should be ordered as DOT/HS-800 000.

## SPECIAL NOTICE

### NEW PRICES FOR DOCUMENTS AVAILABLE FROM NTIS

On January 1, 1971, the National Technical Information Service (NTIS) increased the prices for documents in certain categories. These increases were made necessary by increased costs. Prices are now as follows:

#### PAPER COPY

Most documents announced after January 1, 1969, are priced:

1 to 300 pages	\$3.00
301 to 600 pages	6.00
601 to 900 pages	9.00
Over 900 pages	Exception Price

Two years after announcement, documents having 300 pages or less will have a service charge of \$3.00 added to the announced price. No service charge will be added for documents over 300 pages.

Documents announced prior to January 1, 1969, have a service charge of \$3.00 added to the announced price.

#### MICROFICHE

Microfiche reproduction of documents on a demand basis are priced at 95 cents per document.

## 1/0 ACCIDENTS

### 1/3 Investigation and Records

HS-008 715 Fld. 1/3; 4/5

#### ELECTRONIC DATA PROCESSING TECHNIQUES AS APPLIED TO TRAFFIC ACCIDENT RECORDS

by William Thomas Baker

Washington Univ., Seattle, WO7200

1964 83p 25 refs

Master's thesis.

Electronic data processing techniques can be used as a new approach in attacking the traffic accident problem. Ten kinds of data processing programs are discussed. A completely computerized system can be developed with these methods. Among the recommendations of this study are: closer relationship between law enforcement personnel and the accident analyst; a state agency responsible for accident analysis on a central basis; employment of the same data processing methods in each state; coordination of state efforts with a federal accident analysis agency; and research on computer utilization and accident causation.

Search terms: Data processing / Accident records; Computer programs /Accident records; Accident analysis /State planning; Federal state relationships /Accident analysis; Police cooperation with other agencies; Accident research / Computers

HS-008 716 Fld. 1/3; 5/17; 5/20

#### 1969 ANALYSIS OF MOTOR CARRIER ACCIDENTS INVOLVING VEHICLE DEFECTS OR MECHANICAL FAILURE

Bureau of Motor Carrier Safety,  
Washington, D. C., B32400  
1970 21p

This statistical summary report contains data extracted from 2,922 accident reports in which a vehicle defect or a mechanical failure was a causative factor in the accident.

This report is divided into two parts. Part I contains 5 tables dealing with

passenger-carrying vehicles which accounted for 25 of the accidents covered in this statistical summary. These 25 accidents resulted in 25 injuries and \$83,000 property damage. Part II contains 24 tables dealing with property-carrying vehicles which accounted for 2,897 of these accidents, resulting in 64 fatalities, 1,072 personal injuries, and \$8,266,000 property damage.

Search terms: Defects /Motor carriers; Defective vehicles /Accident causes; Failure caused accidents / Fatalities; Failure caused accidents / Injuries; Property damage accidents / Commercial vehicles; Failure caused accidents /Statistics

HS-008 717 Fld. 1/3; 5/20

#### 1969 ANALYSIS OF ACCIDENT REPORTS INVOLVING FIRE

Bureau of Motor Carrier Safety,  
Washington, D. C., B32400

1970 18p

This statistical summary report contains data extracted from 775 accident reports in which fire was involved in the accident.

This report is divided into two parts. Part I contains 11 tables dealing with property-carrying vehicles, which accounted for 765 of the accidents covered in this summary. These accidents resulted in 126 fatalities, 363 injuries and \$8,926,260 property damage. Part II contains 7 tables dealing with passenger-carrying vehicles, which accounted for 10 of the accidents, 25 injuries and \$156,450 property damage.

Search terms: Secondary fires / Motor carriers; Vehicle fires /Motor carriers; Vehicle fires /Statistics; Accident types /Vehicle fires

HS-008 718 Fld. 1/3; 5/20

#### ANALYSIS AND SUMMARY OF ACCIDENT INVESTIGATIONS 1968

Bureau of Motor Carrier Safety,  
Washington, D. C., B32400

31 Dec 1969 131p

This represents an analysis of 247 commercial motor vehicle accidents which occurred in the calendar year

1968, based upon comprehensive field investigation reports submitted by the Bureau's field staff.

These investigations are aimed primarily at determining as many of the causative and contributing factors as possible with respect to each occurrence.

This study includes a digest of each accident and an overall evaluation of the various factors involved. The report contains notable comparative data with respect to accident conditions, equipment, hazardous cargoes and personnel. However, because these investigations are initiated on a somewhat selective basis, unqualified statistical comparisons to total vehicles, mileage, drivers or experience of prior years are not recommended.

Search terms: Commercial vehicles /Accident statistics; Commercial vehicles /Fatalities; Commercial vehicles /Injuries; Commercial vehicles /Accident investigation; Commercial vehicles / Property damage accidents; Commercial vehicles /Accident types; Commercial vehicles / Accident causes

AVAILABILITY: Reference use only in NHTSA Reference Division; no copies available for distribution.

HS-008 719 Fld. 1/3; 5/20

#### CRASH/INJURY-EJECTION STUDY. COMMERCIAL VEHICLE ACCIDENTS

Bureau of Motor Carrier Safety,  
Washington, D. C., B32400

Mar 1970 8p

This report is a study of data extracted from accident reports submitted by motor carriers to the Bureau of Motor Carrier Safety during the period April 1968 to February 1969. Reports of 211 of the more serious accidents in which the driver and/or relief driver was killed or seriously injured were selected. The data concerns driver ejection from power unit, ejection from sleeper berth to cab, area of ejection, installation and use of seat belts, and driver contact with interior objects in relation to type of power unit involved. This study was made to focus on the areas causing death or serious

### 1/3 Investigation and Records (Cont'd)

HS-008 719 (Cont'd)

injury to commercial drivers involved in accidents.

**Search terms:** Commercial vehicles/Driver fatalities; Commercial vehicles/Driver injuries; Motor carriers/Accident statistics; Injury causes; Fatality causes; Ejection; Seat belt usage

## 3/0 HUMAN FACTORS

### 3/4 Driver Behavior

HS-008 720 Fld. 3/4

**DRIVER BEHAVIOUR EQUATIONS: SOME LIMITS ON THEIR SOLUTION DUE TO VEHICLE DYNAMICS**

by P. A. Lewis

Published in *Traffic Engineering and Control* v12 n8 p414-6, 420 (Dec 1970)

7 refs

It is suggested that causability is the only feasible technique to use when generating notional behaviour models. Thus, the question 'How can a driver behave?' instead of 'How does a driver behave?' should be asked. Some relevant limits on vehicle performance are suggested, and formulae describing the form of the limits are given, together with the source of the data. A desired driver behaviour equation has been assumed for a car following situation. By using simulation techniques, the effect of the limits on an unconstrained solution has been shown. The general change in character of the solution due to each limit is discussed. The article thus consists of a notional restriction on the behaviour of the vehicle, irrespective of the driver's policy.

**Search terms:** Driver behavior / Equations; Vehicle dynamics/Driver

### 3/12 Vision

HS-008 721 Fld. 3/12

**SUBJECTIVE COMPARISON OF THE USE OF CONTACT LENSES AND SPECTACLES FOR DRIVING**

by Janet Stone

Published in *American Journal of Optometry and Archives of American Academy of Optometry* v47 n12 p952-64 (Dec 1970)

11 refs

Contact lenses, as well as spectacles, have advantages and disadvantages when worn for driving. The following points should be given special consideration:

1. Advice on sunspectacles and eye protectors should be given according to the type of vehicle to be driven.
2. Fitting techniques should be used which cause minimum alteration to refraction and no corneal edema, so that if contact lenses have to be removed vision in spectacles is satisfactory for driving.
3. All patients who drive should be instructed to carry with them an up-to-date spectacle correction in a frame which does not obstruct the visual field.
4. Lenses should be fitted which are big enough in the appropriate dimensions to minimize flare and haloes, and of suitable power to allow for night myopia.

**Search terms:** Contact lenses / Driving; Eyeglasses/Driving; Contact lenses /Sunglasses; Night vision; Peripheral vision; Visual acuity; Eye movements; Refraction; Dark adaptation

## 5/0 VEHICLE SAFETY

### 5/4 Design

HS-008 722 Fld. 5/4

**SUITABILITY OF PLASTICS IN DESIGNING PASSENGER VEHICLE COMPONENTS**

by Herman Hablitzel

Volkswagenwerk A. G., Wolfsburg

1971 17p  
Report no. SAE-710103

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

This report demonstrates the scope of the preliminary work required before plastics can be used in the vehicle industry. Consideration must be given to diverse factors such as the special physical properties of the material being used, the influence of the manufacturing process on the properties of the plastic components, as well as the basic design of the item being produced.

Illustrated in detail is the plastic air duct used for the Volkswagen Type 411 sedan, with particular emphasis on ambient influences and combustibility. Plastics have become an accepted part of the vehicle construction scene and any increase in the use of plastics will depend upon data being made available to the engineer in usable form.

**Search terms:** Physical properties / Plastics; Air ducts/Plastics; Volkswagen 411/Air ducts; Automobile design /Plastics

**AVAILABILITY:** SAE

HS-008 723 Fld. 5/4

**AUTOMOTIVE DEVELOPMENTS IN REINFORCED PLASTICS**

by E. P. DePalma; D. E. Lehmkuhl

Ford Motor Co., Dearborn, Mich., F18600

1971 12p 7 refs  
Report no. SAE-710022

Presented at Autoinotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

There has been a steady growth in the use of plastics due to better understanding of its performance, advantages, and limitations. Since 1960, reinforced plastics have played a greater role in the automotive industry in exterior applications. This paper explores the development and uses of glassfiber reinforced thermoplastics and glassfiber reinforced polyesters. Although many of the problems of these reinforcing plastics have

however, with these refinements, the use of reinforced plastics in the automotive industry will substantially increase by 1975, and thereafter.

Search terms: Glass fiber reinforced plastics /Automotive engineering; Thermoplastics /Glass fiber reinforced plastics; Polyester /Glass fiber reinforced plastics

#### AVAILABILITY: SAE

HS-008 724 Fld. 5/4

#### RESIDUAL STRESS IN THE INDUCTION HARDENED SURFACE OF STEEL

by Kentaro Ishii; Mitugi Iwamoto; Toshio Shiraiwa; Yoshiyasu Sakamoto  
Japan. National Railway, Tokyo, J02600; Sumitomo Metal Industries Ltd., Osaka (Japan), S50800

1968 8p

Report no. SAE-710280

Presented at X-Ray Fatigue Division, SAE Fatigue Design and Evaluation Committee, Ann Arbor, Mich., 24-25 Sept 1968.

The residual stresses produced by static and progressive induction hardening processes were investigated using different diameter bars and different heating conditions. The x-ray diffraction method of stress measurement was used. Compressive stresses were observed at and slightly below the surface in the hardened zone, while lower compressive stresses or tensile stresses were seen at the ends of this zone. These stresses depended on the shapes and sizes of the heated zone and the cooling patterns. Shot peening was seen to convert the tensile stress to a compressive value.

Search terms: Residual stress measurement /Steels; Shot peening /Steels; Hardening /Steels; X-ray diffraction /Steels

#### AVAILABILITY: SAE

HS-008 725 Fld. 5/4

#### THE CASE RPS 34 POWER SHIFT TRANSMISSION AND ITS CONTROLS

by J. Lemke; J. C. Rigney

1970 33p  
Report no. SAE-700740

Presented at Combined National Farm, Construction & Industrial Machinery and Powerplant Meetings, Milwaukee, Wisc., 14-17 Sep 1970.

The previously used concept of a power shift transmission coupled with a manual transmission has been carried to completion in the Case RPS 34 transmission. Design limitations caused by retaining the basic housing dimensions of the standard manual transmission and the tractor hydraulic circuitry of the non-power shift transmission were encountered and resolved with a unique control valve design and a compact power shift package.

Search terms: Farm tractors /Transmissions; Automatic transmissions; Farm tractors /Clutches; Farm tractors /Gear boxes

#### AVAILABILITY: SAE

### 5/6 Fuel Systems

HS-008 726 Fld. 5/6

#### IGNITION, COMBUSTION, AND EXHAUST EMISSIONS OF LEAN MIXTURES IN AUTOMOTIVE SPARK IGNITION ENGINES

by Takeshi Tanuma; Kenichi Sasaki; Touru Kaneko; Hajime Kawasaki

Nissan Motor Co. Ltd., Yokohama (Japan), N06000

1971 13p 6 refs  
Report no. SAE-710159

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

Misfire and cycle-to-cycle combustion variation are both serious problems in securing good engine performance and low exhaust emissions in the case of using extremely lean mixtures. Making some modifications in the ignition system and in the combustion chamber, and increasing the mixture turbulence, we examined their effects upon the lean limit, the engine performance, and the exhaust emissions. It was found that gap width and gap projection of a spark plug and spark energy

great effect on extending the lean limit and improving engine performance with lean mixtures. A compact combustion chamber preferable for lean mixture operation. Smooth operation of the engine can be maintained even at retarded spark timing by applying the above mentioned items and providing hot intake air to the engine. Consequently, exhaust emissions, including hydrocarbons and oxides of nitrogen, can be substantially reduced.

Search terms: Engine performance /Exhaust emissions; Engine performance /Lean fuel mixtures; Exhaust emissions /Lean fuel mixtures; Spark timing /Exhaust emissions; Combustion chamber swirl /Engine performance; Combustion chamber design /Engine performance; Spark tests /Engine performance; Spark gaps /Engine performance; Spark ignition engines /Engine performance; Spark ignition engines /Exhaust emissions; Spark ignition engines /Ignition; Spark ignition engines /Combustion; Lean fuel mixtures /Heat

#### AVAILABILITY: SAE

HS-008 727 Fld. 5/6

#### EFFECTS OF ENGINE OIL COMPOSITION ON OIL CONSUMPTION

by Douglas S. Orrin; Bryan W. Coles  
Chevron Research Co., Richmond, Calif., C37800

1971 20p 20 refs  
Report no. SAE-710141

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

Radioactive oils were run in a laboratory V-8 engine to determine the effects of viscosity and volatility on oil consumption. Using a tritium tracer method, very precise oil consumption rate measurements were obtained. The consumption rates of 14 test oils, blended from two crude sources, were measured at different engine speed and load conditions. To compare test oils run on different days a computerized multiple regression analysis was required to compensate for daily variations in oil consumption. Another computer aided statistical analysis

**5/6 Fuel Systems (Cont'd)**

HS-008 727 (Cont'd)

ity and volatility. Both hypothetical and empirical equations were used. Field tests were run to obtain a correlation with the laboratory test. Volatility was found to be the most important single characteristic affecting oil consumption. Smaller and less consistent consumption differences between oils were found in the field tests than in the laboratory engine.

Search terms: Oil consumption /V 8 engines; Oil consumption /Laboratory tests; Computerized test methods /Regression analysis; Viscosity /Oil consumption; Volatility /Oil consumption; Field tests /Oil consumption; Composition /Oils; Engine speeds /Oil consumption; Tritium /Oil consumption

AVAILABILITY: SAE

HS-008 728 Fld. 5/6

AUTO SMOG INSPECTION AT IDLE ONLY, PT. 2: OXIDES OF NITROGEN

by Marian F. Chew  
1971 24p  
Report no. SAE-710071

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

Maintenance programs indicate that exhaust emission controlled cars with hydrocarbon (HC) emissions above 400 ppm or carbon monoxide (CO) above 2.25% will have emissions reduced by proper maintenance. Distribution curves of recent surveillance data show that one-third of the 1966-1969 cars have emissions above these assured reduction levels.

Calculations show that maintenance based on reducing high emitters of HC and CO should reduce total HC by 1%, CO by 30%, but increase oxides of nitrogen ( $\text{NO}_x$ ) by 9%. Further calculations show that maintenance based on reducing high emitters of HC, CO, and  $\text{NO}_x$  should reduce total HC by 20%, CO by 25%, and  $\text{NO}_x$  by 6%.

The inclusion of  $\text{NO}_x$  in the test method is nearly as effective in identifying high emitters of HC, CO, and  $\text{NO}_x$  as the longer seven-mode test method.

Search terms: Vehicle age /Emissions; Exhaust emission control /Automobile maintenance; Idling /Exhaust emission tests; Exhaust emissions /Statistical analysis; Idling /Vehicle inspection; Nitrogen oxides /Idling; Hydrocarbons /Idling; Carbon monoxide /Idling

AVAILABILITY: SAE

HS-008 729 Fld. 5/6

AUTO SMOG INSPECTION AT IDLE ONLY

by Marian F. Chew  
1969 15p  
Report no. SAE-690505

Presented at SAE Mid-year meeting, Chicago, Ill., 19-23 May 1969.

Auto exhaust emission surveys and surveillance programs have shown 10:1 ranges in amounts of hydrocarbon and carbon monoxide emitted by individual cars. Low levels of hydrocarbon and carbon monoxide emissions can be maintained from properly tuned engines. The most practical method to reduce auto pollution would be to identify the high emitters and require proper maintenance.

The purpose of this investigation was to examine existing data from auto exhaust emission surveys and surveillance programs in order to recommend a practical and efficient testing procedure for auto smog inspection. A new mathematical approach is used to discover which modes of the seven mode standard test are most discriminating for the high emitters of carbon monoxide and hydrocarbons. The idle mode is shown to be the best mode for identifying the high emitters.

A 40 sec idle test is developed and applied to tune-up data. At reasonable emission level cut points, net hydrocarbon reductions over the total car population of 19% from uncontrolled cars and 13% from emission controlled cars are calculated. After maintenance the high hydrocarbon or carbon monoxide emitting uncontrolled cars have been reduced to 10%

of 49%. The emission controlled cars showed an average hydrocarbon reduction of 21%.

Search terms: Exhaust emission tests /Idling; Hydrocarbons /Exhaust emission tests; Carbon monoxide /Exhaust emission tests; Statistical analysis /Exhaust emission tests; Tuneup /Exhaust emission tests; Exhaust emission tests /Smog; Vehicle inspection /Exhaust emission tests

AVAILABILITY: SAE

**5/14 Occupant Protection**

HS-008 730 Fld. 5/14

MATERIALS, FABRICATION, AND PACKS FOR AIR CUSHIONS

by David Streed; C. B. Rodenbach  
Uniroyal, Inc., New York, U02500  
1971 10p 5 refs  
Report no. SAE-710018

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

Urethane or neoprene coated over a lightweight nylon fabric appears to be the prime candidate for air cushion material. Evaluations to date show that an air cushion fabricated with vulcanized seams from a neoprene coated ripstop nylon produces the most reliable unit. However, urethane coated nylon also offers potential for a sewn or heat sealed unit. A typical automotive crash pad construction, ABS/vinyl, over an integral urethane foam pad with suitable tear lines, produces satisfactory decorative covers and packs for automotive installation.

Search terms: Air bag restraint systems /Materials; Urethanes /Air bag restraint systems; Nylon /Air bag restraint systems; Neoprenes /Air bag restraint systems; Coatings /Air bag restraint systems; Vulcanizing /Air bag restraint systems

AVAILABILITY: SAE

HS-008 731 Fld. 5/14

STEERING WHEEL AIRBAG COLLISION PERFORMANCE

by K. P. Tait, Jr.; M. R. Pritchard

1971 11p 7 refs  
Report no. SAE-710020

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

**Conclusions based on an experimental program include:** the airbag can be sensed, triggered, and inflated after collision initiation in time (40-50 ms) to provide driver protection; the airbag cushions the face and abdomen at velocities up to 30 mph, and prevents injurious concentrated loads when the impact is centered; head accelerations were below the 80 g/3 ms injury criterion in all cases of impact to the bag; rebound velocities up to 9 mph appear satisfactory; velocities up to 86 mph were imparted by the inflating airbag to the arm initially across the steering wheel. No fractures or head accelerations in excess of 80 g/3 ms injury criteria resulted from arm and hand impact to the head under these conditions; the steering column should not rotate (bend) upward during frontal impact to expose the lower rim to abdominal impact. Also, column bending inhibits collapse of the column; bag shape, size, and pressure blow-out valve should be designed to cause column collapse prior to bag collapse; bag and column should operate together to achieve maximum decelerating distance—the airbag does not eliminate the need for the energy absorbing column; provision for protection from off-center (and oblique) impacts is necessary and can be attained by using a large bag to prevent the driver from wedging between the steering wheel and the door.

**Search terms:** Air bag restraint systems /Impact tests; Steering wheel impact tests; Air bag restraint systems /Injury prediction; Seat belt loading /Impact tests

**AVAILABILITY:** SAE

HS-008 732 Fld. 5/14

**ENERGY SOURCE SELECTION FOR INFLATABLE OCCUPANT RESTRAINT SYSTEM**

Olin Mathieson Chemical Corp., East Alton, Ill., 012300  
1971 9p  
Report no. SAE-710017

Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

**Engineering design features of three types of energy sources for the Inflatable Occupant Restraint System (IORS) are reviewed. These systems use:**

1. Compressed gas
  2. Propellant
  3. A combination of compressed gas and propellant as a power source for the inflation of the restraint cushion. An analysis is presented of each system with advantages and disadvantages related to specific design parameters. The analysis is restricted to present state-of-the-art systems. It is also based on strictly engineering design features with recognition that product cost, patent position, and other intangibles are factors in final energy source selection.
- The analysis indicates several important advantages of the combined propellant-air (hybrid) system over one or both of the other two. These are:
1. Ability to obtain nontoxic gases with currently developed propellants.
  2. More flexibility in control of gas thermodynamics.
  3. The small propellant weight requirements.

**Search terms:** Air bag restraint systems /Propellant actuated devices; Air bag restraint systems /Compressed gases; Air bag restraint systems /Energy storage systems; Thermodynamics /Air bag restraint systems; Toxicity /Air bag restraint systems

**AVAILABILITY:** SAE

## 5/15 Propulsion Systems

HS-008 733 Fld. 5/15

### HYBRID BATTERY SYSTEM

by D. H. Brown

General Electric Co., Schenectady, N. Y., G04800

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

The concept of an acceleration battery to alleviate the reduction in capacity of the lead-acid battery under high drain rates is applicable to electric vehicles that require periodic high peak currents for acceleration and hill climbing. The batteries cannot simply be placed in parallel; they require a resistive connection between them and a variable connection to the load that protects the main battery from excess drain rates in meeting load demands and in recharging the accelerating battery. The resulting performance offers the advantages of reduced main battery weight, extended range, and responsiveness to acceleration demands.

**Search terms:** Hybrid batteries / General Electric Co.; Electric vehicles/Hybrid batteries; Lead acid batteries /Electric vehicles; Nickel cadmium batteries /Electric vehicles

**AVAILABILITY:** SAE

## 5/17 Safety Defect Control

HS-008 734 Fld. 5/17

### ADVANCES IN AUTOMATIC GAGING TECHNIQUES

by Carl A. Griffith

Bendix Corp., Dayton, Ohio, B06900

1971 6p

Report no. SAE-710156

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

Rising labor costs, increased safety standards, pollution control requirements, and costly warranty teardowns have made 100% inspection of more components necessary. The changing technology of automatic gaging and the development of new gaging devices have increased the possibility of greater inspection efficiency.

Some inspection equipment becomes part of a parts-handling system whereby the machine receives parts from previous automation, transfers

## 5/17 Safety Defect Control

HS-008 734 (Cont'd)

them through the machine while inspecting, and deposits them onto the succeeding automation.

Other equipment serves as a gaging station interconnected to a transfer system with no parts handling, and provides feedback signals for part disposition or evaluation.

Another type of machine is a "free-standing" automatic. The parts are loaded either manually or by a parts feeder directly into the parts-handling system of the gaging machines. After inspection the parts are deposited into the customer's receiving equipment.

Search terms: Automated inspection equipment /Gauges; Automated inspection equipment /Manufacturing inspection; Automated inspection equipment /Automotive parts

AVAILABILITY: SAE

## 5/18 Steering Control System

HS-008 735 Fld. 5/18

### LINEAR SUSPENSION SYSTEM PARAMETER IDENTIFICATION

by Glenn A. Jackson; James W. Grant  
Army Tank-Automotive Command,  
Detroit, Mich., A67800

1971 7p

Report no. SAE-710227

Presented at Automotive Engineering Congress, Detroit, Mich., 11-15 Jan 1971.

A method for measuring spring rate and damping coefficient is necessary for complete laboratory evaluation of a suspension component. This report outlines a technique by which a linear model is adjusted by an analog computer so that its parameters match those of the test specimen. The accuracy of this linear model is good unless the test specimen parameters are very nonlinear.

To determine how structural changes in a suspension unit affect the dynamic action of the unit, measurable suspension parameters must be defined. One set of parameters can be

obtained by assuming that, for small angular motion, a single suspension unit can be modelled by a parallel spring-damper combination. This system is completely defined by the two parameters spring rate, K, and damping coefficient, D. This paper outlines a method to measure K and D under laboratory conditions which simulate typical operational environment.

Search terms: Suspension systems /Evaluation; Analog computers /Test equipment; Spring damping /Laboratory tests; Suspension systems /Parameters

AVAILABILITY: SAE

## NHTSA DOCUMENTS

### NHTSA Accident Investigation Reports

HS-600 377 Fld. 1/3

### MULTIDISCIPLINARY ACCIDENT INVESTIGATION SUMMARIES, VOL. I, NO. 6

National Highway Safety Bureau,  
Washington, D. C., N18000

Dec 1970 100p

SUMMARIES OF 44 multidisciplinary accident investigation case studies are cumulated in this volume. Detailed reports have been issued previously as separates. Data is presented under the following headings: identification by time and location; ambience; description of highway; description of vehicles; occupants and injuries; accident kinematics and post crash events; and causal factors, conclusions, and recommendations.

Search terms: Accident investigation /Multidisciplinary teams; Accident location; Time factors / Accidents; Environmental factors / Accidents; Automobile models; Pre-crash phase; Postcrash phase; Crash phase; Injuries; Deformation; Accident causes; Occupant vehicle interface; Occupant kinematics; Vehicle kinematics; Damage; Defective vehicles; Accident case reports

AVAILABILITY: NTIS

## NHTSA Compliance Test Reports

HS-610 427 Fld. 5/17

### FEDERAL MOTOR VEHICLE SAFETY STANDARDS COMPLIANCE TEST PROGRAM SUMMARY, SEPTEMBER 1 TO SEPTEMBER 30, 1970

National Highway Safety Bureau,  
Washington, D. C., N18000

28 Nov 1970 30p

Monthly statistics are presented covering compliance testing of various vehicle models and equipment. Details are presented for compliance tests of hydraulic brake hoses; lamps, reflective devices, and associated equipment; new pneumatic tires; and hydraulic brake fluid.

Search terms: Vehicle safety standards /Compliance tests; Hydraulic brake hoses /Compliance tests; Lamps /Compliance tests; Brake fluids /Compliance tests; Pneumatic tires /Compliance tests; Reflectors /Compliance tests

AVAILABILITY: NHTSA

HS-610 557 Fld. 5/17

### FEDERAL MOTOR VEHICLE SAFETY STANDARDS COMPLIANCE TEST PROGRAM SUMMARY, NOVEMBER 1 TO NOVEMBER 30, 1970

National Highway Traffic Safety Administration, Washington, D. C., N19900

18 Jan 1971 46p

Monthly statistics are presented covering compliance testing of various vehicle models and equipment. Details are presented for compliance tests of windshield defrosting and defogging; hydraulic service brake, emergency brake, and parking brake systems; steering control rearward displacement; windshield mounting; fuel tanks, fuel tank filler pipes, and fuel tank connections; lamps, reflective devices, and associated equipment; new pneumatic tires.

Search terms: Vehicle safety standards /Compliance tests; Defrosters /Compliance tests; Defoggers /Compliance tests; Hydraulic

brakes /Compliance tests; Emergency brakes /Compliance tests; Parking brakes /Compliance tests; Steering control rearward displacement /Compliance tests; Windshield mounting /Compliance tests; Fuel tanks /Compliance tests; Lamps /Compliance tests; Reflectors /Compliance tests; Pneumatic tires /Compliance tests

AVAILABILITY: NHTSA

### NHTSA Contractors Reports

HS-800 359 Fld. 1/3; 5/17

**RELATIONSHIP BETWEEN VEHICLE DEFECTS AND VEHICLE CRASHES. VOL. 1: SUMMARY REPORT. FINAL REPORT**

Stanford Research Inst., Menlo Park, Calif., S37200

Jul 1970 31p  
Contract FH-11-7302

An adapted case study method was used to investigate crashes in which a component defect was a suspected cause. All but four of the cases occurred in Santa Clara and San Mateo counties, an area including a variety of road types. Cases of probable mechanical defects, alcohol involvement, contributing faulty service, and other cases of interest are tabulated. Recommendations include certification of motor vehicle mechanics, education of the public in dangerous vehicle defects, used car inspection, and vehicle design study relative to possible unbalanced stress in vehicle operation on cloverleaf intersections. It is suggested that, for more efficient study of a single aspect of highway accidents, the in-depth case study method be modified to include less serious accidents as well as more severe ones, unbalanced coverage of data elements biased toward the particular study focus, and a simplified case reporting form.

Search terms: Defective vehicles /Accident factors; Defective vehicles /California; Automobile maintenance /Accident factors; Alcohol usage /Accident factors; Defective vehicles /Accident types; Defective

vehicles /Vehicle age; Vehicle design /Cloverleaf interchanges; Mechanic licensing/Defective vehicles; Vehicle inspection /Defective vehicles; Accident investigation /Multidisciplinary teams

AVAILABILITY: NTIS

HS-800 360 Fld. 1/3; 5/17

**RELATIONSHIP BETWEEN VEHICLE DEFECTS AND VEHICLE CRASHES. VOL. 2. TECHNICAL REPORT. FINAL REPORT**

Stanford Research Inst., Menlo Park, Calif., S37200

Jul 1970 216p  
Contract FH-11-7302

Findings are discussed in detail and relevant background material given on the study of the role of component defects in vehicle crashes. For conclusions and recommendations, see volume 1 (summary report).

Search terms: Defective vehicles /Accident factors; Defective vehicles /California; Accident case reports /Defective vehicles; Vehicle mileage /Defective vehicles; Vehicle age /Defective vehicles; Defective vehicles /Brake systems; Defective vehicles /Power trains; Defective vehicles /Wheels; Defective vehicles /Vehicle fires; Motorcycle accidents; Truck overturn accidents; Automobile maintenance /Accident factors; Accident records /California; Computerized design /Accident records; Truck accidents /Cornering; Collisions /Physics; Accident types /Accident records; Vehicle inspection /Defective vehicles; Defective vehicles /Accident types; Fatality rates /California; Injury rates /California

AVAILABILITY: NTIS

HS-800 361 Fld. 1/3; 5/17

**RELATIONSHIP BETWEEN VEHICLE DEFECTS AND VEHICLE CRASHES. VOL. 3. AN INVESTIGATOR'S GUIDE. FINAL REPORT**

Jul 1970 196p 22 refs  
Contract FH-11-7302

The best procedures and methodologies presently available for accident investigation are organized into a standard format. The format is designed so that investigators following it as closely as the conditions surrounding an accident allow, will achieve a consistency in reporting techniques that will permit accurate and perceptive analysis of results with a minimum expenditure of time, effort, and funds. Various reporting schedules available in the literature were examined; methodologies, procedures, and sequences found were modified as required to satisfy the national highway accident investigation program. This guide is designed as a basic reference for investigation trainees and for other persons desiring specific information on various phases of accident investigation. A bibliography is included.

Search terms: Defective vehicles /Accident factors; Defective vehicles /California; Accident investigation /Multidisciplinary teams; Accident investigation training /Multidisciplinary teams; Accident records /Computerized design; Accident investigation /Photography; Damage estimation /Accident investigation; Accident case reports /California; Accident report forms

AVAILABILITY: NTIS

HS-800 362 Fld. 1/3; 5/17

**RELATIONSHIP BETWEEN VEHICLE DEFECTS AND VEHICLE CRASHES. VOL. 4. CASE SUMMARIES. FINAL REPORT**

Stanford Research Inst., Menlo Park, Calif., S37200

Jul 1970 186p  
Contract FH-11-7302

This supplement to the final Technical Report (vol. 2) of the study of the role of component defects in vehicle crashes contains the summaries of the 66 cases described in the "case study findings" section of that report.

## NHTSA Contractors Reports (Cont'd)

HS-800 362 (Cont'd)

cles /California; Accident case reports /Defective vehicles

AVAILABILITY: NTIS

HS-800 363 Fld. 1/3; 5/17

RELATIONSHIP BETWEEN VEHICLE DEFECTS AND VEHICLE CRASHES. VOL. 5. AN ANNOTATED BIBLIOGRAPHY. FINAL REPORT

by Mary Ann Robertson

Stanford Research Inst., Menlo Park, Calif., S37200

Jul 1970 93p 301 refs  
Contract FH-11-7302

An annotated bibliography developed from the literature survey performed for the study of the role of component defects in vehicle crashes is presented.

Search terms: Defective vehicles / Accident factors; Defective vehicles /Bibliographies

AVAILABILITY: NTIS

HS-800 376 Fld. 5/14

CHILD SEAT AND RESTRAINT SYSTEMS TEST PROGRAM. FINAL REPORT

by D. H. Robbins; A. W. Henke; V. L. Roberts

Michigan Univ., Ann Arbor. Highway Safety Research Inst., M40800

31 Oct 1970 80p 6 refs  
Contract FH-11-6962  
Report no. HSRI-BIO-M-70-1

Appendices are announced under the following HS numbers: Vol. 1, HS-800 382; Vol. 2, HS-800 383; Vol. 3, HS-800 384.

The three objectives of this research program were to: (1) define the state of the art in child seating and restraint systems; (2) evaluate the various types of devices which are in use; and, (3) recommend performance requirements and compliance test procedures for

child seating and restraint systems. After an extensive market survey, 37 devices manufactured by 26 companies were selected for the test programs. These devices were tested in frontal, side, oblique, and rear impact. Oscillographic transducer data and high speed motion picture data were obtained and studied.

Search terms: Child restraint systems /State of the art studies; Child safety belts; Child safety seats; Child restraint systems /Impact tests; Child restraint systems /Impact angle; Child restraint systems /Oscillographs; Child restraint systems /Motion pictures

AVAILABILITY: NTIS

HS-800 382 Fld. 5/14

CHILD SEAT AND RESTRAINT SYSTEMS TEST RESULTS. APPENDIX D. VOL. I

by D. H. Robbins; A. W. Henke; V. L. Roberts

Michigan Univ., Ann Arbor. Highway Safety Research Inst., M40800

31 Oct 1970 130p  
Contract FH-11-6962  
Report no. HSRI-BIO-M-70-2-App-D-Vol-1

Final Report is announced under HS-800 376.

This report contains the data records obtained in a test program studying the safety performance of child car seats and restraint systems. Included with each test result is an HSRI Summary Data Sheet, a copy of an oscillographic record of transducer data and high speed photographic documentation of occupant kinematics. In cases where the oscillographic record or the photographic documentation is missing, the data was not obtained.

Search terms: Child restraint systems /Impact tests; Child restraint systems /Oscillographs; Child restraint systems /Motion pictures; Child safety seats /Impact tests

AVAILABILITY: NTIS

HS-800 383 Fld. 5/14

CHILD SEAT AND RESTRAINT SYSTEMS TEST RESULTS. APPENDIX D. VOL. 2

by D. H. Robbins; A. W. Henke; V. L. Roberts

Michigan Univ., Ann Arbor. Highway Safety Research Inst., M40800

31 Oct 1970 254p  
Contract FH-11-6962  
Report no. HSRI-BIO-M-70-2-App-D-Vol-2

Final Report is announced under HS-800 376.

This report contains the data records obtained in a test program studying the safety performance of child car seats and restraint systems. Included with each test result is an HSRI Summary Data Sheet, a copy of an oscillographic record of transducer data, and high speed photographic documentation of occupant kinematics. In cases where the oscillographic record or the photographic documentation is missing, the data was not obtained.

Search terms: Child restraint systems /Impact tests; Child safety seats /Impact tests; Child restraint systems /Oscillographs; Child restraint systems /Motion pictures

AVAILABILITY: NTIS

HS-800 384 Fld. 5/14

CHILD SEAT AND RESTRAINT SYSTEMS TEST RESULTS. APPENDIX D. VOL. 3

by D. H. Robbins; A. W. Henke; V. L. Roberts

Michigan Univ., Ann Arbor. Highway Safety Research Inst., M40800

31 Oct 1970 129p  
Contract FH-11-6962  
Report no. HSRI-BIO-M-70-2-App-D-Vol-3

Final Report is announced under HS-800 376.

This report contains the data records obtained in a test program studying the safety performance of child car seats and restraint systems. Included with each test result is an HSRI Summary Data Sheet, a copy of an oscillographic record of transducer data, and high speed photographic documentation of occupant kinematics. In cases where the oscillographic record or the photographic documentation is missing, the data was not obtained.

Search terms: Child restraint systems /Impact tests; Child safety

seats /Impact tests; Child restraint systems /Oscilloscopes; Child restraint systems /Motion pictures

#### AVAILABILITY: NTIS

HS-800 391 Fld. 5/4

#### BUMPER COMPLIANCE TEST PROCEDURE EVALUATION. FINAL REPORT

by Jack Alpert

Digitek Corp., Marina del Rey, Calif., D18300

Dec 1970 89p  
Contract FH-11-7480  
Report no. DARD-1

Tests were conducted to evaluate the capability of a pendulum impactor to perform as an impact simulator of low speed passenger car impacts. Three common types of accidents have been simulated: "stop and go" accidents with one or both vehicles moving with a differential speed of 10 mph; bumper-to-bumper impacts in parking lots; and car to obstacle impact. The pendulum's ability to differentiate between a car with good low speed impact characteristics and a car with bad ones was evaluated. Recommendations for test improvement, performance goals for bumper standards, and parameters for such a standard are discussed.

Search terms: Bumpers /Safety standards; Bumpers /Impact tests; Bumpers /Compliance tests; Pendulums /Test equipment; Low speed caused accidents; Parking lots /Accident location; Vehicle fixed object collisions; Vehicle vehicle collisions; Bumpers /Damage costs; Bumpers /Repair costs

#### AVAILABILITY: NTIS

HS-800 392 Fld. 5/4; 1/1

#### PREVENTION OF ELECTRICAL SYSTEMS IGNITION OF AUTOMOTIVE CRASH FIRE

by Clifford I. Gatlin; Neva B. Johnson  
Dynamic Science, Phoenix, Ariz., D36000

Mar 1970 161p 11 refs  
Contract FH-11-7347  
Report no. AvSER-2310/20-70-7

Fire occurs in only about 0.5% of all injury-producing auto accidents, killing 1 out of 8 persons involved. The two most probable ignition sources of such fires are sparks from damaged electrical systems and friction sparks generated by the impact. About 200 cars were examined on dealer lots and in wrecking yards to assess the probability of electrical system damage. It was concluded that fires from this cause can be reduced by relocating components and wiring away from vulnerable areas, shielding of components and wiring against impact damage, and incorporating an impact sensitive device to inert the electrical system. A suggested safety standard for automotive electrical systems incorporating these methods is presented, and future methods of study to reinforce the provisions of this standard are given.

Search terms: Vehicle fires /Electric systems; Impact tolerances /Electric systems; Fire prevention /Electric systems; Fire prevention /Sensors; Automobile design /Fire prevention; Vehicle fires /Fatalities; Impact tolerances /Wiring; Safety standards /Electric systems; Fire prevention /Safety standards; Secondary fires /Accident studies; Accident types /Vehicle fires

#### AVAILABILITY: NTIS

HS-800 395 Fld. 5/4

#### DESIGN OF FIELD AND CRASH TEST PROGRAMS FOR INFLATABLE OCCUPANT RESTRAINT SYSTEMS

by R. D. Leis; C. W. Hamilton; E. S. Cheaney

Battelle Memorial Inst., Columbus, Ohio, B03600

12 Nov 1970 104p  
Contract FH-11-7529  
Report no. BCL-G-0555

This report presents a detailed plan for vehicle crash tests and a set of guidelines for a field test for a program to evaluate the effectiveness of Inflatable Occupant Restraint Systems.

Search terms: Air bag restraint systems /Impact tests; Air bag restraint systems /Field tests; Air bag

restraint systems /Automobile models; Air bag restraint systems /Design of experiments

#### AVAILABILITY: NTIS

HS-800 406 Fld. 4/2; 2/0

#### COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY. GUIDE 5. PLANNING

by Mel D. Powell; Michael K. Gemmill; Donald Murray; Warren P. Howe

National Assoc. of Counties Research Foundation, Washington, D. C., N06600

Sep 1970 20p  
Contract FH-11-7091

Basic principles of an effective traffic safety planning program are discussed, emphasizing the planning process itself and the various stages of its development. Aspects covered include state planning and the Highway Safety Act; the formulation of goals; data collection; the identification of problems; development of objectives and plans; implementation and evaluation of plans.

Search terms: Highway safety programs /Community support; Highway safety /State planning; Data acquisition /Highway safety; Highway safety programs /Local government

#### AVAILABILITY: NTIS

HS-800 407 Fld. 3/1

#### DRINKING DRIVER AND TRAFFIC SAFETY PROJECT. ANNUAL REPORT

by Seymour Pollack; Raymond M. Berger; J. Morgan Thomas; Oksana R. Didenko; Chang Hyun; Jack W. Bishop

University of Southern California, Los Angeles. Public Systems Research Inst., U11350

Jul 1970  
Contract FH-11-7099

Title varies.

The drinking driver classification and prediction model proved to be of limited predictive capability. An exploration of the differences between fatality drinking driver population and

## NHTSA Contractors Reports (Cont'd)

### HS-800 407 (Cont'd)

the convicted drunk driver population suggests that the two populations are significantly different. A factor analysis of fatal crash drivers was based on the following factors: criminal record, traffic record, age, occupation, and crash liability situation.

Search terms: Drinking drivers / Mathematical models; Drinking drivers /Fatalities; Drinking drivers / Convictions; Fatalities /Driver records; Fatalities /Driver age; Fatalities /Environmental factors; Drivers /Crime

### AVAILABILITY: NTIS

### HS-800 409 Fld. 3/1

## ALCOHOL ABUSE AND TRAFFIC SAFETY: A STUDY OF FATALITIES, DWI OFFENDERS, ALCOHOLICS, AND COURT-RELATED TREATMENT APPROACHES

by Lyle D. Filkins; Cheryl D. Clark; Charles A. Rosenblatt; William L. Carlson; Margaret W. Kerlan; Linda Manson

Michigan Univ., Ann Arbor. Highway Safety Research Inst., M40800

26 Jun 1970 398p 76 refs  
Contract FH-11-6555; FH-11-7129

Title varies.

Methodology and conclusions on the role of the abusive use of alcohol in traffic safety were developed. Project I is a case-history investigation of 616 traffic fatalities. Project II investigates 1517 persons admitted to Hurley Hospital diagnosed alcoholic or referred to the hospital's alcoholic group therapy program. Project III describes and analyzes published reports of 10 alcoholism treatment programs in the U.S. over the past 20 years, to provide a framework for program planners considering use of court-related treatment for alcoholics and to analyze results of court-induced alcoholism treatment.

Search terms: Alcoholism / Fatalities; Alcoholism /Driver

performance; Driver intoxication / Courts; Alcoholism /Rehabilitation

### AVAILABILITY: NTIS

### HS-800 412 Fld. 4/2; 1/0; 2/0; 3/0

## COMMUNITY ACTION PROGRAM FOR TRAFFIC SAFETY. GUIDE 6: STAFFING

by Mel D. Powell; Michael K. Gemmill; Donald Murray; Warren P. Howe

National Assoc. of Counties Research Foundation, Washington, D. C. N06600

Sep 1970 40p  
Contract FH-11-7091

Previous Guides were announced under the following HS numbers: Guide 1, HS-800 309; Guide 2, HS-800 318; Guide 3, HS-800 365; Guide 4, HS-800 366; Guide 5, HS-800 406.

This guide describes the manpower needs required for successful operation of local traffic safety programs. General recommendations for positions are listed for the following programs: traffic safety coordinator, driver and traffic safety education, codes and laws, traffic courts, alcohol, accident location surveillance, traffic records, emergency medical services, highway construction and maintenance, traffic control devices, pedestrian safety, police services, debris removal.

Search terms: Personnel management /Highway safety programs; Personnel management /Driver education; Personnel management / Courts; Personnel management / Alcohol education; Personnel management /Accident location; Personnel management /Driver records; Personnel management /Emergency medical services; Personnel management /Highway construction; Personnel management / Highway maintenance; Personnel management /Traffic control devices; Personnel management / Pedestrian safety; Personnel management /Debris removal; Community support /Highway safety programs; Local government /Highway safety programs; Manpower utilization / Highway safety programs

### AVAILABILITY: NTIS

## NHTSA Staff Speeches, Papers, etc.

### IIS-810 151 Fld. 3/0

## REMARKS ON MANPOWER DEVELOPMENT AND HIGHWAY SAFETY

by William E. Tarrants

National Highway Safety Bureau, Washington, D. C., N18000  
1970 5p

Presented to National Conference of Governors Highway Safety Representatives, Little Rock, Ark., 13 Oct 1970.

The manpower problem in highway safety is concerned with additional training of people already in the field and with the recruitment and development of new personnel. Both aspects must be considered in relation to the pattern of program growth and organizational growth in the highway safety field. A working relationship between the states and the National Highway Safety Bureau on safety manpower matters is discussed.

Search terms: Federal state relationships /Manpower utilization; Highway safety organizations / Manpower utilization

### AVAILABILITY: NIHTSA

### HS-810 152 Fld. 3/0

## THE EDUCATION ELEMENTS OF SAFETY PROGRAMS

by William E. Tarrants

National Highway Safety Bureau, Washington, D. C., N18000  
1970 15p

For presentation to Sixth World Highway Conference, Montreal, Canada, 9 Oct 1970.

Target populations for education in highway safety are discussed. The first target class consists of the technical, professional, and administrative personnel who are concerned with developing and operating safety programs. The second class consists of those to whom programs are directed, including drivers, passengers, pedestrians, and personnel of the automotive industry. The third target class is the general

public, whose support is needed for safety program success. Safety manpower needs are discussed, and ways of reaching each target population are outlined.

**Search terms:** Highway safety programs /Manpower utilization; Highway safety /Community support; Highway safety /Public relations; Driver education; Pedestrian education; Safety education; Automotive industry /Highway safety

#### AVAILABILITY: NHTSA

HS-810 153 Fld. 3/5

#### THE ROLE OF DRIVER EDUCATION IN TRAFFIC SAFETY

by William E. Tarrants

National Highway Safety Bureau, Washington, D. C., N18000

Published in *Journal of Traffic Safety Education* v18 n2 p9-11 (Jan 1971)

9 refs

The very pragmatic position of the Bureau is to keep the level of Federal support in operational driver education programs under reasonable control while going all-out with research to obtain better scientific evidence than heretofore has been available, on the overall payoff in driver education or the differential payoff among alternative driver education techniques and programs.

**Search terms:** Driver education / Benefit cost analysis; National Highway Traffic Safety Administration / Driver education

#### NHTSA Imprints

HS-820 094 Fld. 1/3; 2/0

#### PROGRAM MATRIX FOR HIGHWAY SAFETY RESEARCH

by James C. Fell; Scott N. Lee

National Highway Traffic Safety Administration, Washington, D. C., N19900

Dec 1970 50p

Contract FII-11-7572

Presented at Highway Collision Investigation Training Program, Cornell Aeronautical Laboratory 4

A program matrix is described which represents a logical approach to the highway safety problem in general and a specific classification for accident investigation information. Phases of collisions have been arbitrarily defined for compatibility purposes, and examples of accident-related information for each matrix cell have been given. Researchers can utilize the matrix as a guide in their analyses and as a classification aid in reporting study findings with respect to particular accidents. The precrash, crash, and postcrash phases are examined in regard to the vehicle, the human factors, and the environmental factors.

**Search terms:** Crash phase; Pre-crash phase; Postcrash phase; Highway safety programs /Accident research; Accident investigation / Human factors; Accident investigation /Environmental factors; Accident investigation /Failures; Driver vehicle interface /Accident investigation

#### AVAILABILITY: NHTSA

HS-820 097 Fld. 1/3; 5/3; 1/2

#### STAFF MEMORANDUM ON THE ANALYSIS OF FATAL MOTORCYCLE CRASHES IN THE UNITED STATES, 1966-1970

by Glenn G. Parsons

National Highway Safety Bureau, Washington, D. C., N18000

Dec 1970 6p

Fatal motorcycle crashes have been analyzed to compare the fatality experience in states having helmet laws with the experience in states not having helmet laws and to estimate the total deaths and fatal crash rates for 1970. States with helmet laws showed a consistently lower crash rate than did states without helmet laws.

**Search terms:** Motorcycle operator fatalities /Headgear laws; Helmets / Motorcycle operator fatalities; Accident statistics /Motorcycle operator fatalities; Accident rates /Motorcycle accidents; Motorcycle accidents /Forecasting; Headgear / State laws

HS-820 098 Fld. 1/3; 5/3; 1/2

#### STAFF MEMORANDUM ON THE ANALYSIS OF MOTORCYCLE FATAL CRASHES IN ILLINOIS, MICHIGAN, OKLAHOMA, AND KANSAS, 1966-1970

by Glenn G. Parsons

National Highway Safety Bureau, Washington, D. C., N18000

Dec 1970 8p

The motorcycle fatal crash experience of four states is analyzed and compared by the type of helmet law in effect. The fatal crash rate was found to be 27.5% lower when helmet laws were in full effect for the full year studied. The rate was higher when the law was in only partial effect and still higher when no helmet law was in effect.

**Search terms:** Motorcycle operator fatalities /Headgear laws; Helmets / Motorcycle operator fatalities; Headgear laws /Illinois; Headgear laws / Michigan; Headgear laws /Oklahoma; Headgear laws /Kansas; Accident statistics /Motorcycle operator fatalities

#### AVAILABILITY: NHTSA

HS-820 099 Fld. 3/3; 4/1

#### STAFF MEMORANDUM ON THE CONSTITUTIONAL QUESTION PRESENTED BY STATE MOTORCYCLE HEADGEAR REQUIREMENTS

National Highway Safety Bureau, Washington, D. C., N18000

Nov 1970 17p refs

The question presented is whether a state requirement that persons riding motorcycles shall wear a protective head device of a type approved by the state is unconstitutional under the Fourteenth Amendment. Court decisions on this question are discussed.

**Search terms:** Headgear laws / Court decisions; Helmets /Court decisions; Motorcycle operators / Headgear laws; Constitutional law / Court decisions; Constitutional law /Headgear laws; Headgear /State laws

**NHTSA Imprints (Cont'd)**

HS-820 099 (Cont'd)

HS-820 100 Fld. 5/6

**MOTOR VEHICLE EMISSIONS: A SELECTED BIBLIOGRAPHY**

National Highway Safety Bureau,  
Washington, D. C., N18000  
Oct 1970 35p

This bibliography on motor vehicle emissions is classified by type of document: congressional, monographs,

journal articles, reports, and papers within books

Search terms: Emissions/Bibliographies; Air pollution / Bibliographies

HS-820 101 Fld. 5/20

DOUG TOMS: "SHAPE UP ... OR GET OFF THE ROAD"

by Douglas Toms; Carl R. Glines; Neil R. Regeinbal

Published in *Commercial Car Journal*  
v120 n6 p82-6 (Feb 1971)

Editorial on interview included

Douglas Toms is interviewed on truck regulations and standards being considered by the National Highway Traffic Safety Administration. Regulation of road usage by trucks and proposals for underride guards are discussed

Search terms: Trucking industry / Interviews; Trucking industry / Editorials; Highway usage restrictions /Trucks; Underride guards



# executive summary

## SYNOPSIS OF A RECENTLY RELEASED NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION RESEARCH REPORT

### GUIDELINES FOR INFORMATION TO BE INCLUDED IN DRIVER LICENSE FILE

The purpose of the research project synopsized here was to provide the basis for a set of recommendations to the States on information that should be obtained during the initial driver license application and to investigate data processing and information renewal consideration.

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Report is in 4 volumes listed below:

**ANALYSIS OF INFORMATION TO BE INCLUDED IN DRIVER LICENSE FILE**—Vol. I  
DOT/HS-800 292-PB-194 977                  140 pages

**GUIDELINES FOR INFORMATION TO BE INCLUDED IN DRIVER LICENSE FILE**—Vol. II  
DOT/HS-800 293-PB-194 978                  36 pages

**INITIAL DRIVER LICENSE QUESTIONNAIRE SUMMARY**—Vol. III  
DOT/HS-800 294-PB-194 979                  99 pages

**BIBLIOGRAPHY ON DRIVER LICENSING**—Vol. IV  
DOT/HS-800 295-PB-194 980                  39 pages

### GENERAL INFORMATION ABOUT THE REPORT

Volume I, Analysis of Information to be Included in Driver License File, discusses the initial driver licensing information that should be obtained, how it should be obtained, and the length and place of retention. The information content of the initial driver license application form is also discussed.

Volume II, the Guidelines report, summarizes the volume I report and presents a suggested driver license application form which was developed based on the results of the study. Volume III describes the methodology employed and the analysis of data which resulted from the questionnaire survey. Volume IV presents the bibliography.

### MAJOR FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The information which can be obtained in initial driver licensing was classified as screening, identification, evaluation, research, administrative, and other. Information potentially desirable to be obtained was also identified and evaluated. The project made use of reported results of analytical studies, a questionnaire survey was conducted as part of this study, and where necessary, the author's subjective analysis was used.

#### Screening Information

- Reported correlations between screening criteria and accidents are low or non-existent. For existing screening criteria, this means either the screening procedure is effec-

tive or there is at best a weak correlation. Present research studies are not adequate to differentiate between these two alternatives.

- Because of the uncertainty associated with the correlations and the lack of information on costs, the decision on what screening procedures are beneficial and what information should be obtained is difficult. Another factor to be considered is the ability of the driver to influence the licensing decision. It is concluded that erroneously not licensing an acceptable driver is reasonable if:

- 1) An individual is classified according to a legitimate screening criteria into a high accident group, and
- 2) The individual can control his inclusion or exclusion in the group.

Based on these criteria, the revocation of a driver license because of traffic law violations would be acceptable.

Screening information recommended for acquisition is that associated with convictions and medical impairments.

- The medical impairments found hazardous to driving are: epilepsy, cardiovascular disease, alcoholism and problem drinking, mental illness, drug addiction or influence, conditions affecting coordination and mobility, diabetes, vision impairments, and mental retardation. If all individuals identified as having one or more of these medical conditions were denied license, many acceptable drivers would be prohibited from driving. It is therefore recommended that a medical review board be established to review referred medical cases to determine their suitability to drive. Although the screening performed by a medical review board is not known to reduce screening errors, it can reduce total cost if the evaluators will consider the individual's social cost.
- Information identifying individuals with pertinent medical conditions should be obtained by:
  - Asking the applicant pertinent questions,
  - Testing by licensing examiner,
  - Obtaining admission information from selected institutions,

- Soliciting information from the public (with safeguards to prevent driver harassment),
- Requesting a search of the National Driver Register,
- Encouraging physicians to voluntarily report medically impaired drivers.

- Conviction data are recommended to be obtained from the National Driver Register, the applicant, and the Driver License File of the state of application.

#### Identification Information

- Four types of identification are used in driver licensing.
  - 1) When an applicant applies for an initial license, it is desirable to identify records that may influence the decision to issue a driver license.

Recommended data for identifying the applicant's record are: applicant's name, social security number, sex, and height.
  - 2) For enforcement purposes, it is necessary to ascertain if the driver is licensed to drive and that the driver license identifies the driver. For driver-driver license identification, it is recommended that a color photograph be taken and the applicant's sex, eye color, and height be obtained.
  - 3) From one record, it is necessary to identify other records, e.g., it is desirable to identify the driver license record from information on the driver license. For intraorganizational record-to-record identification, it is recommended that any identification be permitted so long as it uniquely identifies a driver and is suitable for automated search. For inter-organizational record-to-record identification, it is recommended that the applicant's social security number and name be obtained.
  - 4) When issuing a person a driver license, it is necessary to ascertain that the person being issued the license is the person that passed the screening criteria. For this person-to-person identification it is recommended that an applicant's name,

social security number, sex, eye color, and height be obtained.

#### Other Information

- The type of license, license expiration date, applicant's street address, applicant's mailing address, applicant's signature, false information clause, name of adult assuming obligation for a minor driver, and driver license approval signature should also be classified as information necessary to the initial licensing process.
- Before any new driver licensing programs or procedures are implemented, they should be researched to obtain cost and benefit estimates. If the program is found desirable, and is implemented, then it should continually be reevaluated for the purposes of improvement, benefit cost justification, and management efficiency. Provisions should be made for the collection and use of research and evaluation information on a sample basis.

#### Renewal Considerations

- Not all of the information obtained is valid for the life of the driver. How frequently it is desirable to renew or purge the data must be determined. For most medical conditions, if no costs were involved in obtaining health status information, it would be desirable to frequently check all drivers, since the inception of most medical disorders can occur at any age. However, costs are involved, and therefore much data collection must be tempered with practical consideration. At the present time, the optimum data collection period from a cost-benefit standpoint is unknown.
- Some nonmedical information, such as applicant's sex, birth date, and color of eyes, is valid for the driving life of an individual. Other information only need be updated when necessary, e.g., applicant's name, address, and weight only require updating when they change. Still other nonmedical information should be updated at each license renewal. License expiration date and photograph are examples of this type of information. Some information should be obtained for a period of time and then purged from the system. This includes a minor's sponsor and possibly old conviction data.

#### Data Processing

- A major function of a state's licensing agency is the keeping of driver records. Presently, 25 states have automated driver licensing systems, 17 more are in the process of implementing an automated system, and 7 more are planning for an automated system.
- Most of the data recommended for acquisition was also recommended for retention in an automated driver license file. Exceptions include: medical history of a driver which should be kept in a confidential file, photograph which should appear only on the driver license, applicant's signature which should be on the driver license and in the source document file, false information clause which should be in the source document file, driver license approval signature which should appear on the driver license, and the minor's sponsor which should be retained in the source document file.

#### Licensing Process Considerations

- Recommendations that are to be implemented must be practical and specific. For this reason:
  - 1) Suggestions were made on the specific questions to be used for obtaining information on the applicant's medical and driving history,
  - 2) False information and minor's sponsor statements were constructed,
  - 3) Types and class of license were discussed, and
  - 4) An example application form designed.

#### Conclusions

The recommendations in this report are based on the results of reported analytical studies, a survey of 119 individuals knowledgeable in highway safety, and where necessary the author's subjective analysis.

The medical conditions that should be considered in licensing the driver are: epilepsy, cardiovascular disease, alcoholism and problem drinking, mental illness, drug addiction or influence, conditions affecting coordination and mobility, diabetes, vision impairments, and mental retardation.

Recommended sources for obtaining information on the medical conditions specified in the previous paragraph are:

Applicant—Ask applicant about all the medical conditions except mental retardation and conditions affecting coordination and mobility.

Licensing Examiner—The licensing examiner should test applicant's vision. The knowledge and road test should be useful in screening out applicants who are suffering from mental retardation or conditions affecting coordination and mobility.

Institutions—Information should be obtained from instructions treating epileptics, alcoholics and problem drivers, the mentally ill, and the blind.

Public—Information should be obtained from the public on all pertinent medical conditions. Safeguards need to be established to prevent harassment.

National Driver Register—The National Driver Register should be checked to determine if any applicant has had a license denied, suspended, or revoked.

Physicians—Physicians should be encouraged to voluntarily report medically impaired drivers.

The primary sources of driving history data for initial license application should be the National Driver Register, the applicant, and the Driver License File of the state of application.

Information that should be obtained, where it should be retained, and for how long it should be retained are summarized in the report.

Provisions should be made for the collection and use of research and evaluation information.

The contractor Manager has certified that the contractor's work has been satisfactorily completed and that all contractual obligations have been met.

The opinions, findings, and conclusions expressed in this summary are those of the contractor and not necessarily those of NHTSA.

Availability: These reports may be ordered in paper copy (PC) or microfiche (MF) from NTIS. Order by DOT/HS or PB numbers that appear under the title of each report.



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